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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WANG, JIN CHENG	
ART UNIT	**PAPER NUMBER**
2628	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/20/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/798,070	HILD ET AL.	
	Examiner	Art Unit	
	Jin-Cheng Wang	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's submission filed on 11/14/2006 has been entered. Claims 1, 4-5, 10, 13-15 and 20 have been amended. Claims 1-20 are pending in the application.

Response to Arguments

Applicant's arguments filed November 14, 2006 have been fully considered but are moot in view of the new ground(s) of rejection set forth below.

As address below, the claim 1 is anticipated by **S. Ma, et al., "EventMiner: An integrated mining tool for Scalable Analysis of Event Data", May 21, 2001,** www.research.ibm.com, in view of D. Kranzlmuller, S. Gradbner, J. Volkert, "**Event graph visualization for debugging large applications", Proc. of the SIGMETRICS symposium on Parallel and distributed tools,** Philadelphia, PA, United States, Pages: 108 – 117 (hereinafter Kranzlmuller).

The cited prior art Ma reference teaches in Fig. 7 and the last paragraph of the Page 12 plotting the primary attribute (e.g., with the attribute values indicating the troublesome hosts having significantly high event counts) versus time with the attribute values for events in a communication network and the primary attribute is selected from a plurality of attributes related to the one or more significant measurements such as the co-occurrences (i.e., the total number of times that two hosts generate events within a predefined time window), the conditional probability of the two hosts (i.e., the probability of a host generating an event given the observation that the other host has generated an event), the chi-squared test and so on. Moreover,

the Fig. 4 shows the coloring of the events having the seconary attribute with the patterns indicating the authentication failure and SNMP request in order to differentiate using the coloring the events with authentication failure from other events. A pattern label is assigned to the events falling into the same pattern. Finally, the operator can view different event attributes by switching menus (Fig. 6).

Ma has taught in Fig. 7 and the last paragraph of the Page 12 plotting the primary attribute (e.g., with the attribute values indicating the troublesome hosts having significantly high event counts) versus time with the attribute values for events in a communication network. Ma has also taught a plurality of attributes related to the one or more significant measurements such as the co-occurrences (i.e., the total number of times that two hosts generate events within a predefined time window), the conditional probability of the two hosts (i.e., the probability of a host generating an event given the observation that the other host has generated an event), the chi-squared test and so on wherein the attribute values are plotted in the same plot. It is clear that Ma discloses attributes including categorical attributes of the hosts, event types, severity of the events, etc. See Figs. 2, 6, 7 and 9.

In Ma many significant event patterns are simultaneously identified within a single plot without the operator's switching between the various event attributes.

Ma discloses display label to the events such as "Link down of host A", "node down of host B", "authentication failure of host A", etc., including the colors for coloring the different patterns that indicate the attribute values of the primary attribute such as the co-occurrences of some specific events within a predefined time window.

Ma discloses a secondary display label including the colors for coloring the different patterns for the events in the communication network that indicate the attribute values of the primary attribute such as the co-occurrences of some specific events within a predefined time window.

Ma teaches in Fig. 5(b) displays two different attributes for the events; Figs. 2 and 4 show y-axis is the host name attribute as well as the coloring of attribute such as "authentication failure" events in red and "SNMP request events in green; therefore, at least two event attributes such as host name, authentication failure, SNMP request have been simultaneously monitored in the plot of Figs. 2 and 4. The menu options shown in Fig. 6 allow for the y-axis attribute mappings be changed. Moreover, Ma teaches mapping a plurality of attributes to item and viewing both numerical attribute and categorical attribute on a same plot in Fig. 7 (See Page 10). Thus, Ma at least teaches or suggests the claim limitation of viewing a secondary attribute of said each event together with the primary attribute on said display.

Ma is silent to "automatically generating a large variety of visualizations along other attribute axes, and identifying correlations by superimposing and cross-referencing these visualizations."

However, Kranzlmuller teaches the claim limitation of "automatically generating a large variety of visualizations along other attribute axes, and identifying correlations by superimposing and cross-referencing these visualizations."

Kranzlmuller teaches automatically generating a large variety of visualizations (P0-P7) along the other attribute axes (*See Kranzlmuller Page 109 and Figs. 1-2 showing the arrangement of the axes applied to the visualization of the event graph wherein a plurality of*

visualizations for dimensions P0-P7 are superimposed in the event graph) and identifying correlations (*such as the inter-process dependencies between processes among the event visualizations wherein dependencies among the processes mean correlations among the processes in the event visualizations*) by superimposing (*the processes/dimensions P0-P7 are superimposed vertically wherein the events belonging to the dimensions P0-P7 are plotted with the attribute values of the events or dimension values being allocated to each of the processes/dimensions P0-P7 and the attribute values for example are the colors which are changed to indicate the state of the process in the value range of {active, idle, blocked}; see Page 109 and therefore the y-axis presents the attribute values allocated to each of the processes/dimensions P0-P7*) and cross-referencing (*e.g., the inter-process dependencies between processes, e.g., directed edges between vertices are either communication or sequential program flow and the events A1 and A1 occur in process P0, Event B1-B3 occurs in process P1. In process 1 the event B1 has the attribute of being the send event and A1 has the attribute of being the receive event. The send event B1 and the receive event A1 is connected through a directed arc in the graph. The process axis is arranged vertically*) these visualizations.

Kranzlmuller teaches viewing a plurality of attributes P0-P7 for the visualizations of the events in a communication network. Kranzlmuller teaches viewing a secondary categorical attribute (e.g., an event belonging to the category P0) of said each event together with the primary categorical attribute (e.g., an event belonging to the category P1) on said display (See Page 109, Fig. 2).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to have incorporated Kranzlmuller's teaching into Ma to view a plurality of attributes related to the events on the same display because Ma at least suggests the claim limitation of viewing a secondary attribute of said each event together with the primary attribute on said display at least by the means of mapping of the secondary attribute and coloring the secondary attribute and therefore the secondary attribute and the primary attribute are distinctly viewed (*See Figs. 2 and 4 of Ma wherein a plurality of secondary attributes are colored so as to be viewed. Although the menu options are used in Fig. 6 of Ma to switch the primary attribute to the another attribute, the secondary attribute can be viewed by the coloring mechanism as disclosed and can be further queried and displayed in different plots on the same display*).

One of the ordinary skill in the art would have been motivated to do so such that the inter-process dependency among events and event categorical attributes are visualized (Kranzlmuller Page 109).

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 10:

Claim 10 recites "computer readable program on tangible computer media". The claimed tangible computer media is not necessarily a computer readable medium. The claimed computer readable program is not necessarily computer executable instructions. There is no structural and

functional interrelationship between the instructions and the rest of the computer to permit the instructions' functionality to be realized. Claim 10 is, thus, non-statutory.

Claim 11:

Claim 11 recites "a computer program on a computer readable medium containing a program code to carry out all steps of the method of claim 1". The claimed computer program is not necessarily computer executable instructions. There is no structural and functional interrelationship between the instructions and the rest of the computer to permit the instructions' functionality to be realized by the computer. Claim 11 is, thus, non-statutory.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

For example, the claim 1 recites "automatically generating a large variety of visualizations along **other attribute axes**, and identifying correlations by superimposing and cross-referencing these visualizations."

By the claim limitations, the visualizations are generated along **other attribute axes.** However, lines 7-11 of the claim 1 refer the x-axis and y-axis as attribute axes. It is understood from the claim limitations set forth in the claim 1 that other attribute axes as claimed are the axes other than the x-axis and y-axis. See also Fig. 1 of applicant's specification. However, the axes as claimed other than the x-axis and y-axis set forth in lines 7-11 of the claim are not disclosed in applicant's specification. The applicant's specification (e.g., Fig. 1) shows that the visualizations are superimposed and cross-referenced along the y-axis with respect to the x-axis. There are no other axes involved in these visualizations. Therefore, the metes and bounds of the coverage of at least base claim 1 cannot be ascertained.

To comply with the "written description" requirement of 35 U.S.C. 112, first paragraph, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filling date sought, he or she was in possession of the invention. The invention is, for purposes of the "written description" inquiry, whatever is now claimed. Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). For purposes of written description, one shows "possession" by descriptive means such as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). Such descriptive means cannot be found in the disclosure for the inventions of the claim 1.

The claims 1-13, and 15-19 depend upon the claim 1 and are rejected due to their dependency on the claim 1.

The claims 14 and 20 are subject to the same rationale of rejection set forth in the claim 1.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 recites the limitation "the machine" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over S. Ma, et al., "EventMiner: An integrated mining tool for Scalable Analysis of Event Data", May 21, 2001,

www.research.ibm.com in view of D. Kranzlmuller, S. Gradbner, J. Volkert, "**Event graph visualization for debugging large applications", Proc. of the SIGMETRICS symposium on Parallel and distributed tools,** Philadelphia, PA, United States, Pages: 108 – 117 (hereinafter Kranzlmuller).

Claim 1:

Ma teaches a method of monitoring events in a computer network, the method comprising:

Said computer network triggering said events, each event being provided with attribute values allocated to a given set of attributes of said each event (*The term "attributes" are not clear as it may be related to the data object attributes for each event or the pattern attributes for each pattern for a plurality of data objects; However, the pattern attributes for a plurality of data objects are also related to the data object attributes as a pattern is computed from the plurality of data objects. The cited reference teach mapping a plurality of data attributes to item to identify correlations across different hosts and event types by using the mapping that maps the pair of event type and host name to item and leaves key empty. See Page 11. Moreover, the cited reference in Page 1, second paragraph, explicitly teaches the attribute values, see the last paragraph of Page 6 and the first and second paragraphs of Page 8, the last paragraph of Page 12, and* ***the real data set*** *collected from a production computer network containing thousands of managed nodes including routers, hubs and servers are described in the last paragraph of page 3 and identifying unknown event patterns that can be used for real-time monitoring is described in the second paragraph of page 3. Ma has also taught* ***a plurality of pattern attributes related to***

the one or more significant measurements such as the co-occurrences, *i.e., the total number of times that two hosts generate events within a predefined time window, the conditional probability of the two hosts, i.e., the probability of a host generating an event given the observation that the other host has generated an event, the chi-squared test and so on*);

Simultaneously monitoring various event attributes versus the arrival time of said events (*e.g., Fig. 5(b) displays two different attributes for the events; Figs. 2 and 4 show y-axis is the host name attribute as well as the coloring of attribute such as "authentication failure" events in red and "SNMP request events in green; therefore, at least two event attributes such as host name, authentication failure, SNMP request have been simultaneously monitored in the plot of Figs. 2 and 4*);

Providing an event display with a cross plot having x and y coordinate axes, the x-axis presenting a time period and the y-axis present an attribute value range (*e.g., The cited reference teach mapping a plurality of data attributes to item to identify correlations across different hosts and event types by using the mapping that maps the pair of event type and host name to item and leaves key empty. See Page 11. Figs. 2, 4, 6, 7, 9 and the third paragraph of Page 8 describes a scatter plot or cross plot having an y-axis representing around 160 hosts of a communication network and the x axis has been described in the figures as well as the first paragraph of page 6; for attribute value range, see these figures as well as the description in the second paragraph of Page 8*);

Determining a primary attribute of the events selected from the given set of attributes to be presented with its attribute values on the y-axis of the cross plot (*e.g., The cited reference teach mapping a plurality of data attributes to item to identify correlations across different hosts*

and event types by using the mapping that maps the pair of event type and host name to item and leaves key empty. The attributes including the categorical attributes or temporal attributes and the primary attribute values are displayed in Figs. 2, 4, 6 and 7 and multiple attributes are described in the last paragraphs of Page 11 and 12),

Allocating a first display label (*e.g., one of the colors indicating the patterns such as the Pattern 1, Pattern 2, Pattern 3 and Pattern 4 as marked in the scatter plot or the cross plot of Figs. 2, 6, 7 and 9 such as "Link down of host A" and "node down of host B"*) to the events (*e.g., alarms in Page 10*) indicating (*mapping of the attributes wherein the mapping results are shown in the plots with the patterns identifying/indicating the attribute values of the primary attribute related to the categorical attribute such as the host A or the host B. Moreover, the pattern attribute values identifying the pattern 1 and the pattern 2 also describe the primary attribute such as the host A and the host B for the patterns such as "Link down of host A" and "node down of host B"*) the attribute values of the primary attribute (*e.g., co-occurrence of certain events or the categorical attribute and event type associated with the events wherein the primary attribute is related to the primary attribute of the data set or the primary attribute of the patterns; See Page 12 and the key attribute values are described in the second paragraph of page 3*), providing a pattern algorithm (*the pattern algorithm is described in Fig. 7 as well as the mining algorithm as described in the last paragraph of page 12 or the EventMiner for ordering categorical values wherein the event generating, say every 300 seconds, may be identified*) to detect whether an arrived event (*arrived event are the selected event objects or the selected data objects in a specific time range related to the events progressively loaded from a database or the mining alarm logs in a real time system; see first paragraph of page 13 and the last paragraph*

of page 10 and a new query that retrieves the relevant data objects for more analysis in which a new query is restricted to a range constraint for a numerical attribute; see the last paragraph of page 10) is part of the given pattern (*is part of the given pattern such as the Pattern 1 or the Pattern 2 from the identifiable patterns such as the* ***SNMP request, authentication failure, link up, link down, port up, port down*** *wherein authentication failure indicates a possible security intrusion and* ***link down of host A indicates the attribute associated with the data objects as well as the attribute associated with the event***) on the basis of a comparison of the attributes allocated to the given pattern and of the attributes assigned to the arrived event (*e.g., the co-occurrence measurements for events can be computed for the data sets or the data objects and the temporal correlation with the selected hosts from the other side of the AttributeViewer can be identified using the color linkage by the coloring and filtering algorithm or the data mining algorithm in which the difference or similarity in terms of patterns indicated by colors is compared; see page 12-13*), providing a mapping algorithm to map any attribute value of an attribute selected from the given set of attributes onto the y-axis of the cross plot (*see the last paragraphs of Page 11-12; The cited reference teach mapping a plurality of data attributes to item to identify correlations across different hosts and event types by using the mapping that maps the pair of event type and host name to item and leaves key empty.*),

Allocating a second display label (*e.g., one of the colors indicating the patterns such as the Pattern 1, Pattern 2, Pattern 3 and Pattern 4 as marked in the scatter plot or the cross plot of Figs. 2, 6, 7; SNMP request, authentication failure, link up, link down, port up, port down wherein authentication failure indicates a possible security intrusion may be used as display labels as well. The attribute values may be used as display labels as well*) to the events indicating

the attribute values of the attributes being uncovered (*discovered*) as part of the given pattern (*e.g., the co-occurrence measurements for events can be computed and the temporal correlation with the selected hosts from the other side of the AttributeViewer can be identified using the color linkage by the coloring and filtering algorithm or the data mining algorithm in which the difference or similarity in terms of patterns indicated by colors is compared; see page 12-13; the display labels indicate the attribute values of the attributes being discovered as part of the given pattern, for example, the second host was near a critical level for a key metric indicates the attribute values of the attributes being discovered as part of the given pattern)*, plotting all the events arrived within the time period and including an attribute value allocated to the primary attribute into the cross plot with the first display label indicating the primary attribute, the position of the first display label of each event in the cross plot being determined on the basis of the attribute value of the primary attribute of the event and its arrival time (*e.g., The cited reference teach mapping a plurality of data attributes to item to identify correlations across different hosts and event types by using the mapping that maps the pair of event type and host name to item and leaves key empty. Figs. 2, 4, 6, and 7 and the related paragraphs mentioned above in "allocating a first display label". e.g., one of the colors indicating the patterns such as the Pattern 1, Pattern 2, Pattern 3 and Pattern 4 as marked in the scatter plot or the cross plot of Figs. 2, 6, 7; SNMP request, authentication failure, link up, link down, port up, port down wherein authentication failure indicates a possible security intrusion may be used as display labels as well. The attribute values may be used as display labels as well*), and

Plotting the all events arrived within the time period (*Figs. 2, 4, 6, and 7 plot the all events within a specific time range*) and being detected by means of the pattern algorithm (*by the*

event miner algorithm) as part of the given pattern into the cross plot with the second display label (*e.g., one of the colors indicating the patterns such as the Pattern 1, Pattern 2, Pattern 3 and Pattern 4 as marked in the scatter plot or the cross plot of Figs. 2, 6, 7 and 9 or Pattern 2 or the Green Spike in Fig. 10*), the position of the second display label of each event in the cross plot being determined by the mapping algorithm on the basis of the attribute value of the attribute of the event (*see Figs. 1-10*) on the basis of the attribute value of the attribute of the event being uncovered (*uncovered for example in the alarm log and uncovered by the mining algorithm*) as part of the given pattern and its arrival time (*discovered as part of the given pattern such as Patterns 1-4 and its arrival time; all the selected events are in a specific time range as plotted in Figs. 2, 4, 6, 7 and 10*).

In other words, Ma discloses an apparatus and system for monitoring events in a computer network enabling an operator of an intrusion-detection system to simultaneously monitor various event attributes versus the arrival time of the events, for example, authentication failure indicates a possible security intrusion may be used as display labels. The cited prior art teaches in Fig. 7 and the last paragraph of the Page 12 plotting the primary attribute (e.g., with the attribute values indicating the troublesome hosts having significantly high event counts) versus time with the attribute values for events in a communication network and the primary attribute for a host is selected from a plurality of attributes related to the categorical values, the one or more significant measurements such as the co-occurrences (i.e., the total number of times that two hosts generate events within a predefined time window), the conditional probability of the two hosts (i.e., the probability of a host generating an event given the observation that the other host has generated an event), the chi-squared test and so on.

Fig. 4 shows the coloring of the events having the primary attribute with the patterns indicating the authentication failure and SNMP request in order to differentiate using the coloring the events with authentication failure from other events. A pattern label is assigned to the events falling into the same pattern. Finally, the operator can view different event attributes by switching menus (Fig. 6).

Ma has taught in Fig. 7 and the last paragraph of the Page 12 plotting the primary attribute (e.g., with the attribute values indicating the troublesome hosts having significantly high event counts) versus time with the attribute values for events in a communication network. Ma has also taught a plurality of attributes related to the one or more significant measurements such as the co-occurrences (i.e., the total number of times that two hosts generate events within a predefined time window), the conditional probability of the two hosts (i.e., the probability of a host generating an event given the observation that the other host has generated an event), the chi-squared test and so on wherein the attribute values are plotted in the same plot. See Figs. 2, 6, 7 and 9. Many significant event patterns are simultaneously identified within a single plot without the operator's switching between the various event attributes.

Ma discloses display label including the colors for coloring the different patterns that indicate the attribute values of the primary attribute such as the co-occurrences of some specific events within a predefined time window.

Ma teaches in Fig. 5(b) displays two different attributes for the events; Figs. 2 and 4 show y-axis is the host name attribute as well as the coloring of attribute such as "authentication failure" events in red and "SNMP request events in green; therefore, at least two event attributes such as host name, authentication failure, SNMP request have been simultaneously

monitored in the plot of Figs. 2 and 4. The menu options shown in Fig. 6 allow for the y-axis attribute mappings be changed. Moreover, Ma teaches mapping a plurality of attributes to item and viewing both numerical attribute and categorical attribute on a same plot in Fig. 7 (See Page 10). Thus, Ma at least teaches or suggests the claim limitation of viewing a secondary attribute of said each event together with the primary attribute on said display.

Ma is silent to "automatically generating a large variety of visualizations along other attribute axes, and identifying correlations by superimposing and cross-referencing these visualizations."

However, Kranzlmuller teaches the claim limitation of "automatically generating a large variety of visualizations along other attribute axes, and identifying correlations by superimposing and cross-referencing these visualizations."

Kranzlmuller teaches automatically generating a large variety of visualizations (P0-P7) along the other attribute axes (*See Kranzlmuller Page 109 and Figs. 1-2 showing the arrangement of the axes applied to the visualization of the event graph wherein a plurality of visualizations for dimensions P0-P7 are superimposed in the event graph*) and identifying correlations (*such as the inter-process dependencies between processes among the event visualizations wherein dependencies among the processes mean correlations among the processes in the event visualizations*) by superimposing (*the processes/dimensions P0-P7 are superimposed vertically wherein the events belonging to the dimensions P0-P7 are plotted with the attribute values of the events or dimension values being allocated to each of the processes/dimensions P0-P7 and the attribute values for example are the colors which are changed to indicate the state of the process in the value range of* ***{active, idle, blocked}****; see*

Page 109 and therefore the y-axis presents the attribute values allocated to each of the processes/dimensions P0-P7) and cross-referencing (*e.g., the inter-process dependencies between processes, e.g., directed edges between vertices are either communication or sequential program flow and the events A1 and A1 occur in process P0, Event B1-B3 occurs in process P1. In process 1 the event B1 has the attribute of being the send event and A1 has the attribute of being the receive event. The send event B1 and the receive event A1 is connected through a directed arc in the graph. The process axis is arranged vertically*) these visualizations.

Kranzlmuller teaches viewing a plurality of attributes P0-P7 for the visualizations of the events in a communication network. Kranzlmuller teaches viewing a secondary categorical attribute (e.g., an event belonging to the category P0) of said each event together with the primary categorical attribute (e.g., an event belonging to the category P1) on said display (See Page 109, Fig. 2).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to have incorporated Kranzlmuller's teaching into Ma to view a plurality of attributes related to the events on the same display because Ma at least suggests the claim limitation of viewing a secondary attribute of said each event together with the primary attribute on said display at least by the means of mapping of the secondary attribute and coloring the secondary attribute and therefore the secondary attribute and the primary attribute are distinctly viewed (*See Figs. 2 and 4 of Ma wherein a plurality of secondary attributes are colored so as to be viewed. Although the menu options are used in Fig. 6 of Ma to switch the primary attribute to the another attribute, the secondary attribute can be viewed by the coloring mechanism as disclosed and can be further queried and displayed in different plots on the same display*).

One of the ordinary skill in the art would have been motivated to do so such that the inter-process dependency among events and event categorical attributes are visualized (Kranzlmuller Page 109).

Re Claims 2-3:

Ma further discloses selecting the new events within the specified time period and plotting the new events within the shifted time period into the cross plot. See Figs. 6, 7, 9 and 10 in which events in the two time periods are drawn and the spikes are identified and the newly selected events are redrawn as determined by the data mining algorithm for the time period during which the new events are retrieved. The database records the attribute values and the arrival time of a new event. The pattern algorithm determines on the basis of the recorded attribute values of event whether or not the newly arrived event in the database and the newly retrieved event from the database includes an attribute value of the primary attribute, for a certain host and event type, as determined the pattern algorithm using the mapping mechanism for mapping a plurality of attributes including the primary attribute into an item for presentation, and the pattern algorithm also determines if the newly arrived event, e.g., alarm, includes the attribute value for the primary attribute, e.g., a certain host or a certain event type including *SNMP request, authentication failure, link up, link down, port up, port down, link down of host A, node down of host B etc.*, shifting the x-axis of the cross plot for the new time period so that the new time period being presented on the x-axis covers the arrival time of the event and plotting the event arrived within the shifted time period into the cross plot with the first display label indicating the primary attribute.

Ma discloses determining on the basis of the recorded attribute values of event from the alarm log or the database whether or not the newly arrived event for the new time period is part of the given pattern using the pattern algorithm on the basis of a comparison of the attributes allocated to the given pattern, for example a composite pattern of Page 13, on the basis of a comparison analysis, and of the attribute assigned to the arrived event wherein the newly arrived event are determined by the retrieval time ranges and data ranges including the host names and types from the database. Ma further discloses determining if the newly arrived event includes an attribute value of the given pattern including the mutual dependence measurement of an m-pattern adding the event to the previous events being detected as part of the given pattern, and redrawing all the events being associated with given pattern in the cross plot by updating the cross plot.

Re Claims 4-5:

Ma further discloses the third display label and the fourth display label indicating the new patterns (See the three colored spikes in Fig. 6 and the four patterns in Fig. 7).

Ma discloses determining if the newly arrived event does not include an attribute value of the given pattern, on the basis of the recorded attribute values of all previous arrived events from the alarm logs or from the database, by means of the mining algorithm whether or not the newly arrived event is part of a new pattern on the basis of a comparison (Page 13) of the attributes allocated to the new pattern and of the attributes assigned to the arrived events. Ma discloses allocating a third display label to the events, including the coloring of the new pattern, indicating the attribute values of the attributes being discovered as part of the new pattern wherein a large

amount of patterns can be discovered by the mining algorithms. Ma discloses plotting the all events being detected by means of the mining algorithm as part of the new pattern into the cross plot with the third display label indicating the new pattern, the position of the third display label of each event in the cross plot being determined by the mapping algorithm (Page 12 for the mapping of the attributes into item and thereby determining the positions of the patterns on the cross plot) on the basis of the attribute value of the attribute of the event (event types, host names etc) being uncovered as part of the new pattern, such as *SNMP request, authentication failure, link up, link down, port up, port down, link down of host A, node down of host B etc*, and its arrival time in the database.

Ma discloses removing all the events including an attribute value allocated to the primary attribute from the cross plot, if a primary attribute to be presented with its attribute values on the y-axis of the cross plot is changed (if the mapping mechanism for mapping a plurality of attributes including the host names and event types are changed), allocating a fourth display label including *SNMP request, authentication failure, link up, link down, port up, port down, link down of host A, node down of host B etc*, to the events indicating the attribute values of the new primary attribute (e.g., category attribute, event type of data objects). Ma discloses plotting all the events arrived within the time period as retrieved from the database and including an attribute value allocated to the new primary attribute into the cross plot with the fourth display label, including *SNMP request, authentication failure, link up, link down, port up, port down, link down of host A, node down of host B etc, indicating the new primary attribute,* such as the host name and event type, the position of the fourth display label of each event in the cross plot being determined by the mapping mechanism in Page 12 on the basis of the attribute value of the

primary attribute of the event and its arrival time as determined by the retrieval condition from the database.

Re Claim 6:

Ma further discloses the operator selects the events to be plotted and displaying textual and coloring information associated with the selected events on the event display (Page 4 and Figs. 6, 7, 9-10).

Ma discloses plotting all attribute values, including the attributes such as event type, link down, and host name, host A, in the patterns marked as the link down of host A, node down of host B, recorded for an event, as retrieved from the database, with the respective display label into the cross plot if the event is selected by an operator and displaying textual information associated with the selected event on the event display.

Re Claim 7:

Ma further discloses a pattern algorithm such as the data mining algorithm suitable to perform multi-attribute pattern recognition (Figs. 6, 7, 9-10).

Ma discloses the mining algorithm being suitable to perform multi-attribute pattern recognition using the mapping mechanism (Page 12) and the pattern comparisons/matching (Page 13).

Re Claim 8:

Ma further discloses using color such as Red and Green to color the pattern Spikes and Pattern 1, Pattern 2, Pattern 3, Pattern 4 for specific mark layouts (Figs. 6, 7, 9-10).

Ma discloses each display label includes different colors marking the events.

Re Claim 9:

Ma further discloses all events being uncovered as part of the pattern being clustered by the display label such as Red Spikes, Green Spikes (Figs. 6, 7 and 9-10).

Ma discloses all events being discovered as part of the pattern as clustered by the different labels including Red Spikes and Green Spikes to indicate one of the plurality of events such as *SNMP request, authentication failure, link up, link down, port up, port down, link down of host A, node down of host B etc, indicating the new primary attribute.*

Re Claim 10:

Ma further discloses a data mining algorithm and GUI (Page 14). Ma discloses the mining algorithm carrying the steps as recited in the claim 1.

Re Claim 11:

Ma further discloses the program code being stored on data carrier (see page 5). Data carrier is inherent within the computer embodiment of Page 5.

Re Claim 12:

Ma further discloses an event visualization device for monitoring events in a computer network (Page 3). *The cited reference teach mapping a plurality of data attributes to item to identify correlations across different hosts and event types by using the mapping that maps the pair of event type and host name to item and leaves key empty. See Page 11. Moreover, the cited reference in Page 1, second paragraph, explicitly teaches the attribute values, see the last paragraph of Page 6 and the first and second paragraphs of Page 8, the last paragraph of Page 12, and* ***the real data set*** *collected from a production computer network containing thousands of managed nodes including routers, hubs and servers are described in the last paragraph of page 3 and identifying unknown event patterns that can be used for real-time monitoring is described in the second paragraph of page 3.*

Re Claims 13 and 15:

Ma further discloses an implementation of the Event Miner algorithm on the computer (Page 4-5).

Claim 14:

The claim 14 is subject to the same rationale of rejection set forth in the claim 1.

Claim 16:

The claim 16 is subject to the same rationale of rejection set forth in the claims 2-4.

Claim 17:

The claim 17 is subject to the same rationale of rejection set forth in the claim 5.

Claim 18:

The claim 18 is subject to the same rationale of rejection set forth in the claims 2-4.

Claim 19:

The claim 19 is subject to the same rationale of rejection set forth in the claim 5.

Claim 20:

The claim 20 is subject to the same rationale of rejection set forth in the claim 1.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (571) 272-7665. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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